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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/023,826	12/19/2001	Khosrow Lashkari	10745/29	3163

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EXAMINER

KNEPPER, DAVID D

ART UNIT PAPER NUMBER

2654

DATE MAILED: 01/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/023,826		LASHKARI ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	David D. Knepper		2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

1. Applicant's correspondence filed on 21 October 2005 has been received and considered. Claims 1-25 are pending.

The amended claims were entered but the amendments to the specification list paragraphs that do not exist as numbered in the amendment. The amendment makes confusing references to “paragraphs” which are apparently line numbers on pages 3, 8 and 15 of the specification. The text of lines 1-13, page 8 (full paragraph) appears to be identical in the amendment which refers to page 8 as compared to the original text which indicates further confusion as to whether this represents intended changes or not.

#### **Title**

2. The title is objected to because it is too verbose. Suggested title: “Joint Optimization of Speech Excitation and Filter Parameters”. This title is suggested based upon the applicant’s arguments.

#### **Drawings**

3. The drawings are objected to because they do not show the claimed “excitation function”. The applicant argues that this is shown in figure 2A, as one of the lines coming out of box 36 in support of claim 1. Therefore, the applicant is assumed to mean that box 36 contains details for producing the excitation function. Figure 2A, box 36 indicates that LPC coefficients are used to find an optimum excitation function but the relevant step in claim 1 states “generating an excitation function using an excitation module” but no such module is shown in figure 2A. The relevant step of claim 1 goes on to indicate “said excitation function comprising a number of

non-zero pulses within an analysis frame separated by spaces therebetween” but figure 2A fails to show any pulses or spaces commensurate in scope with this claim language. Thus, it is imperative that both the module and the excitation function should be illustrated to support the applicant’s arguments and to be commensurate with the scope of the claims. Correction is required.

### **Specification**

4. The disclosure is objected to because of the following informalities:

Patent applications have been identified by serial number on pages 3 and 15. However, the manner by which the lines/paragraphs were identified is confusing as explained above causing difficulty regarding proper entry of the amendments of 21 October 2005.

Appropriate correction is required.

### **Claims**

5. Claims 1-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The applicant’s arguments of 21 Oct 2005 state “...joint optimization is clearly not shown in Kroon.” However, joint optimization is not clearly taught by the applicant. To the contrary, page 17 of the specification indicates that the improvement lies with “...the improved

optimization algorithm reduces the computational load required to compute the synthesized speech  $s(n)$  by taking into account the sparse nature of the excitation pulses” (lines 16-24).

While it is possible that this issue could be resolved by overcoming confusion (see below re: 112, 2<sup>nd</sup>) it appears that the applicant may be trying to claim parallel processing where only series processing steps are disclosed (i.e. – figure 3).

The applicant’s arguments regarding a “standard root finding algorithm” indicate that it is iterative and therefore, admitted prior art since iterative solutions are the most common mathematical solutions for root finding problems.

6. Claims 1-25 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The new claims language is confusing because the “generating” step implies calculations similar to the term “computing”. However, the added language using the term “selecting one of a plurality of excitation functions and selecting roots” implies a look up table.

The language “including selecting one of a plurality of excitation functions and selecting roots of the synthesis polynomial...” added to the “computing” step of the method is contradictory over the limitation that “computing” is performed “...in response to only said number of non-zero pulses” which indicates nothing except for non-zero pulses can be used.

The claim language also more confusing because it is unclear how to interpret the applicant’s generating and computing steps to create a coherent method for “digitally encoding speech”. Should there be separate steps for generating an excitation function, computing

synthesized speech from the generated excitation function and another step for selecting polynomial roots that define a synthesis filter? How do these steps interact? Are they all based on the same analysis frame? Is an analysis frame derived from input speech or should this (or other parts of the analysis) be considered well-known prior art?

The claimed equations have been clarified.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-8, 12, 16, 17 and 19 are rejected under 35 U.S.C. § 103 as being unpatentable over Kroon (5,664,055) in view of Gao (6,449,590).

As claimed, Kroon teaches “digitally encoding speech”. He utilizes an “excitation function comprising a number of non-zero pulses separated by spaces therebetween; and computing a synthesized speech in response to said non-zero pulses and non computing a contribution of said spaces” as shown in figure 1 in combination with his improvements. It is significant to note that Kroon teaches any number of details upon which claims 1-8, 12, 16, 17 and 19 read. Figure 1 shows pulses upon which computations must be made in combination with spaces which do not require any computations and is used by Kroon as background showing how

earlier systems (fig. 2) used a simpler pattern of excitation pulses which merely repeated.

While it is difficult to tell whether all claim elements merit consideration because of the confusion noted above, the applicant argues that Kroon does not teach joint optimization which includes both excitation and roots of the synthesis polynomial. Therefore, Gao is used to show that it is well known to optimize codebook excitation information (col. 34, lines 41-col. 35) using the iterative analysis by synthesis method and also that his use of Line Spectral Pair inherently performs transmutation of LPC parameters which are roots of these polynomials on the z-unit circle (col. 47, lines 57-63). It would have been obvious to combine Kroon and Gao because both are performing known calculations to improve methods for jointly optimize adaptive and fixed codebook systems (Gao, col. 34, lines 43-44; Kroon, col. 4, lines 56-59).

Claim 2: The use of a “synthesis filter polynomial using an iterative root optimization algorithm” is taught with his polynomials shown in col. 13-14. Kroon shows additional detail by indicating that line spectral frequencies may be used because they have known polynomial representations which are easily solved in such a way that the mathematical relationships between conjugate pairs may be exploited in order to solve them using known recursive (“iterative”) techniques.

Claim 3: See his fig. 1. Uniform spacing of excitation would be a regular pulse excitation. Since Kroon teaches adaptive excitation further improved with fractional calculations, non-uniform spacing will occur.

Claim 4: Uniformed spacing is shown in figure 2, labeled as prior art.

Claim 5: See figure 1, to LPC Synthesis filter.

Claim 6-8: figure 1 shows more than one pulse which is therefore multipulse and spaces

do not include pulses (unlike spaces in the prior art, fig. 2 that do include a pulse).

Claim 12: Convolution is the mathematical process by which a computer applies excitation to LPC parameters in the synthesis filter to generate speech.

Claims 16, 17, 19: computing a synthesis polynomial is shown by Kroon in col. 13, lines 37-col. 14 where he explicitly teaches using the well known mathematical relationships with polynomials and root solutions techniques in a Linear Prediction synthesizer.

9. Claims 9-11, 13-15, 18 and 20-25 are rejected under 35 U.S.C. § 103 as being unpatentable over Kroon (5,664,055) in view of Gao (6,449,590) as applied to claims 1-8, 12, 16, 17 and 19 in further view of Chen ("A New algorithm for Parameter Re-optimization in Multi-Pulse Excitation LP Synthesizer).

It is noted that Kroon does not explicitly teach the particular equations claimed. However, he teaches that it is well known to use polynomial (col. 13) root solutions in combination with multipulse (his one or more main pulses) Linear Prediction speech coding systems (col. 1, lines 55-64). Chen teaches that it is well known to optimize the both the excitation and the LPC parameters using the identities on page 561 – see his teaching that it is well known to re-optimize the synthesis filter parameters and pulse amplitudes in the Multi-Pulse Excitation Linear Prediction Synthesizer (abstract). It would have been obvious for a person having ordinary skill in the pertinent art, at the time the invention was made, to combine the optimization of Chen with the LPC of Kroon because Chen teaches that it will improve the quality of the synthesized speech greatly (see abstract and page 563).



Thus, the simplified equations claimed would have further been obvious because the use of a partial derivative (i.e. – claims 11, 20 and 25) for polynomial solutions taught by Chen on page 561 teach that the solution may be derived with the A term only. Thus, the simplified form of convolution such as claimed by the applicant in claims 9, 10, 13, 18, 21 and 22 are obvious mathematical manipulations. Alternativley, the simplified convolution would be obvious if the error is presumed to be very low or equal to zero.

Claims 23 and 24 are rejected under similar arguments as applied to claims 3-5 as noted above.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

11. Some correspondence may be submitted electronically. See the Office's Internet Web site <http://www.uspto.gov> for additional information.

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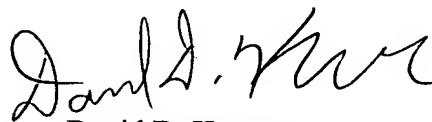
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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David D. Knepper whose telephone number is (571) 272-7607. The examiner can normally be reached on Monday-Thursday from 07:30 a.m.-6:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (571) 272-7602.

For the Group 2600 receptionist or customer service call (571) 272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Inquiries regarding the status of submissions relating to an application or questions on the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by email at [ebc@uspto.gov](mailto:ebc@uspto.gov). For general information about the PAIR system, see <http://pair-direct.uspto.gov>.



David D. Knepper  
Primary Examiner  
**Art Unit 2654**  
January 23, 2006